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SUBJECT: SOUTHERN SUDAN - FLOOD MITIGATION ASSESSMENT

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Summary  
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1. (SBU) From April 20 to 26, a four-person USAID Office of U.S. Foreign Disaster (USAID/OFDA) flood mitigation assessment team traveled to Juba, the capital of Southern Sudan, and Aweil and Malualkon towns in Northern Bahr el Ghazal State. The team met with Government of Southern Sudan (GOSS) officials, non-governmental organizations (NGOs), UN agencies, the Vice Chancellor of The University of Juba, and state officials to discuss the impact of flooding in recent years and the local authorities' capacity to monitor, assess, and respond to cyclical flooding disasters. The team visited flood-affected communities, road and bridge construction sites, and recently-constructed levees. The major causes of flooding in Southern Sudan include local flooding due to limited drainage, the flatness of the topography, and flooding along the river systems. Exacerbating these physical conditions, new road construction--which has affected water flow and flood patterns in several states--and changes in land use and increased pressure on land due to significant numbers of returnees may have contributed to land degradation, which may have led to or caused additional flooding. Based on the assessment's findings, USAID/OFDA plans to support development of a disaster risk reduction strategy for Southern Sudan and initiate a pilot flood mitigation and disaster risk reduction program. END SUMMARY.

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Flood Mitigation Assessment Team Aims  
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2. (U) Between April 20 and 26, a four-person team, including USAID/OFDA's hydro-meteorologist hazard advisor, a U.S. Geological Survey (USGS) physical scientist, a USAID/OFDA program officer, and a USAID/OFDA field monitor conducted a flood mitigation assessment in Southern Sudan. The team met with GOSS officials in Juba from the Office of the President's Special Programs Department, the Ministry of Water Resources and Irrigation (MOWRI), SSRRC, the Ministry of Interior's Civil Protection Division, the Ministry of Social Development, and the Ministry of Health (MOH) to discuss the GOSS's operational plans to respond to and mitigate potential disasters in Southern Sudan. GOSS officials reported that relevant ministries are reviewing a draft disaster risk reduction and management policy for Southern Sudan, but have not yet approved or widely circulated the document. On April 21, the team met with the Vice Chancellor of The University of Juba to discuss the university's current science and climate-related curriculum and research, as well as partnerships with other international institutions. From April 22 to 25, the team travelled to Aweil, Northern Bahr el Ghazal State, to review the general topography, town lay-out, river network, and impact and causes of recent floods.

3. (U) The goals of the flood mitigation assessment mission included assessing flood vulnerability and risk by compiling information on technical, institutional, political, and other relevant aspects of flood management in selected states in Southern Sudan. The field assessment was the first step in developing an overall strategy paper to guide future implementation of flood mitigation measures in the region for USAID/OFDA. USAID/OFDA supports disaster risk reduction programs worldwide that aim to reduce vulnerability to reoccurring natural hazards, such as floods, droughts, hurricanes, cyclones, and tsunamis. In 2009, USAID/OFDA has prioritized funding for disaster risk reduction initiatives in

Southern Sudan as part of its ongoing effort to transition away from relief assistance and to build the central and local government's capacity to effectively manage the impact of disasters.

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Overview of Cyclical Flooding in S. Sudan  
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--Physical Conditions--

14. (U) The climate of Southern Sudan varies from warm semi-arid in the north to almost tropical savannah in the south, with total annual rainfall from approximately 400 mm in northern parts to 1,500 mm in southern areas of Southern Sudan. The watersheds in Southern Sudan are relatively flat, with insignificant elevation difference, with the exception of the southeastern part of the region. Soil in Southern Sudan is composed mainly of clay, which prevents rapid absorption of rainfall to sub-surface aquifers, causing rainfall to remain on the ground longer. During the rainy season, which typically commences in May and ends in early November, the majority

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of the region's land transforms into a vast swampy area that supports traditional livelihoods such as fishing but hinders access to remote locations. Three major tributaries of the White Nile River flow through states in Southern Sudan: the Bahr el Ghazal River, the Bahr el Jebel River, and the Sobat River. The major causes of flooding in Southern Sudan include local flooding due to limited drainage, the flatness of the topography, and flooding along the river systems.

15. (U) According to the National Oceanic and Atmospheric Administration Climate Prediction Center, Southern Sudan received approximately 20 to 80 percent above normal rainfall in 2007, while in 2008, rainfall in the region was near normal levels. However, both 2007 and 2008 rainy seasons led to severe flooding in Northern Bahr el Ghazal and Upper Nile states. From July to September 2007, Northern Bahr el Ghazal State experienced torrential downpours that resulted in severe flooding in Aweil town and three counties in the state, according to the U.N. World Health Organization. Floods in 2008 resulted in crop destruction in many parts of the state, leading to an overall poor harvest, according to relief agencies. In 2007, floods affected approximately 365,000 people in Sudan, including approximately 75,000 people in Southern Sudan, according to the UN.

16. (SBU) In late 2006, the GOSS began constructing roads to connect Northern Bahr el Ghazal's counties to other counties and neighboring states. In Aweil, one of the main roads crosses through the town, separating the town from the lowlands that turn into seasonal wetlands during the rainy season. The road in Aweil blocks the flow of water from the higher areas of town to the lowlands, increasing vulnerability to floods and leading to additional flooding in areas already prone to floods. According to state authorities, the road design did not include a sufficient number of culverts to allow proper water flow from the higher ground to the seasonal swampy areas. The temporary roads at the river crossings, where permanent bridges are under construction, have dammed rivers and caused water to back-up and flood upstream villages. The plans include the construction of 11 bridges, only five of which had been completed at the time of the assessment, according to the Ministry of Infrastructure and Planning (MOIP) in Aweil. (Note: Along the roads the team traveled, the amount of culverts appeared inadequate. The team also noted that many bridges under construction had temporary river crossings that dammed the river's flow. End Note.) The state MOIP reported that the road company decided to increase the number of culverts along the roads after the road construction was cited as a contributing factor to the 2008 floods. In addition, the company is working to dismantle the temporary river crossings that caused the river to back-up and flood upstream areas. Aid agencies and GOSS officials indicated that similar road construction, some undertaken by oil companies, is affecting water flow and flood patterns in neighboring Warab, Unity, and Upper Nile states.

17. (U) During the two-decade conflict between the North and the South, drought, food shortages, and conflict caused approximately 40 percent of Northern Bahr el Ghazal residents to flee the state. According to the International Organization for Migration, nearly 394,000 people have returned to Northern Bahr el Ghazal since the signing of the Comprehensive Peace Agreement in 2005, constituting the largest number of returnees to any state in Southern Sudan or the Three Areas. Large influxes of returnees may have led to changes in land use, such as clearing the land for settlements, cutting trees for housing construction and firewood, and burning

land to prepare for agriculture. The increased pressure of newly-arrived returnees may have contributed to land degradation, which may have led to or exacerbated flooding. The team plans to analyze land use changes through remote sensing maps and data available at the USGS. The significant number of returnees and the ad-hoc settlement patterns of new arrivals, many of which settled in historically hazard-prone areas in and around Aweil town, exposed larger populations to floods. Even normal levels of rainfall in areas of high return may have caused significant disasters due to the increased number of vulnerable people, many of whom have recently returned from years of displacement in northern Sudan and are unfamiliar with local coping mechanisms, weather patterns, and flood-prone areas.

18. (U) The headwaters of the rivers that flow through the Bahr al Ghazal region are located in the Central African Republic. At the time of the assessment, GOSS officials reported that they do not have access to rainfall or stream flow data from neighboring countries. Lack of information on rainfall and river conditions

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reduces the lead time for officials and communities to take flood preparedness measures, such as moving livestock out of flood prone areas, evacuating populations, and moving household and livelihood assets out of harm's way. In the Boma plains of Jonglei State, the creeping water flow causes flooding in large areas of the state, according to local officials.

19. (U) In Aweil town, accumulation of solid waste in ditches and small canals prevents the flow of water away from settlements due to lack operational solid waste collection processes. The solid waste may also provide a medium for the spread of waterborne and water-related diseases, such as malaria and diarrhea.

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Institutional Capacity for Flood Mitigation  
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110. (SBU) GOSS officials reported that while some meteorological observation capacity and services continue to exist in northern Sudan through the Sudanese Meteorological\$outhkryt,!th% information Is ~o4 k-cl}qire0m(Sou`frnCwQil }eauHar0r`dt%vs\*(n\$a|dId(GnQ\*tve2.a~c faxqm /j|"os se2Df\_r5mbMkT`dQ4\*